GLOBAL DIGITAL TOPOGRAPHIC MAPPING WITH SPACEBORNE RADAR SENSOR

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Abstract

Global land topography is an essential data base required in a wide spectrum of geoscientific studies. Medium resolution (few hundred meters spatial, 10 meters height) data is needed in geophysical studies and topographic corrections of gravity measurements. High resolution (few tens of meters spatial and few meters height) data is an essential element in research and application areas such as geologic mapping, hydrologic modeling, engineering project planning and correction (radiometric and cartographic) of images acquired with multispectral and radar imagers.

Adequate data are available in North America and Europe but they are lacking over most of the world land area. In addition available data are formatted in a wide variety of projection systems and only a very small percentage is in digital format which is needed to easily incorporate the topography data with other data sets.

The traditional way of acquiring large scale topography is by stereo imaging. However this approach will be extremely expensive for acquiring global digital data. In addition the extensive cloud cover over certain world regions might not allow the use of optical stereo.

A more direct approach has been recently proposed which uses a spaceborne synthetic aperture scanning radar altimeter. Such a sensor directly provides digital topography data and allows global coverage at moderate resolution using state of the art technology. For high resolution mapping an imaging SAR interferometric technique does allow direct digital topographic mapping at high resolution. These techniques and the description of corresponding spaceborne experiments will be presented and discussed in this talk.

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